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Combat Crew

strategic air command

JUNE 1987

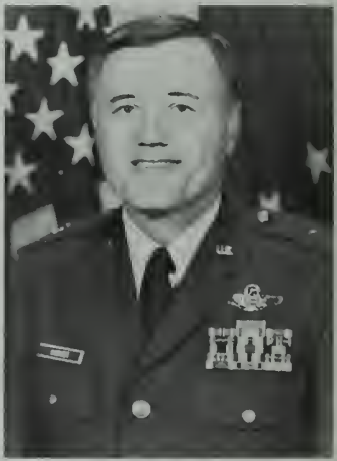
GET PROACTIVE!

As SAC's Inspector General, I'm in a rather unique position to view the entire spectrum of this great command. After visiting several units, I can confidently say you are doing a great job; especially when it comes to Safety. Last year's statistics are testimony to an outstanding commitment in all functional areas of the command. In fact, within the realm of ground safety, we experienced 26 fatalities, the fewest in the history of the command. Increasing this level of commitment is my primary concern. Can we improve upon these results? Can we strive for a zero mishap rate? You bet we can! But it's not an easy road. We are plowing new ground both in mission areas and hardware. The place to focus our efforts is our Safety commitment.

Experts agree there are two types of mishap causes: Materiel and Personnel. The first type involves equipment failure and is often not preventable. You can only react to these failures as they occur. The quality of your response, however, will be based on the habits acquired and developed during your daily training. If you challenge yourself and make the most of your training, you will have a better chance of surviving a materiel mishap. The second type of mishap is directly related to checklist adherence and personal discipline. Ignoring technical data and regulations can only lead to disaster. Checklists and regulations were developed as a result of the painful experience of others. Doing it differently condemns us to repeat past mistakes. With these mishaps in mind, how do we evaluate our safety commitment?

A common reaction after listening to several mishap reports during a safety meeting is, "It can't happen to me." "Even if it does," the response continues, "I'll manage to pull through with a little skill and luck." This is a dangerous notion since it provides a false sense of security. Instead of evaluating our safety commitment, we are postponing looking at our shortcomings. You can't increase your safety commitment by refusing to take a look at it. The bottom line is, how can we effectively anticipate both types of mishaps and increase our safety commitment?

The approach I recommend is make your commitment PROACTIVE. Attack your job with discipline and determination while demanding the same from others. What you are doing and how safely you do it is critical to our national security. Instead of thinking your discipline is good enough, prove it each flight. Attack the regulations and manuals as though each flight was your first. Demand discipline from each crew member you work with. Train hard and apply every lesson learned from each mishap message to prepare for an unexpected materiel failure. Consider each situation covered during a safety meeting your own and review your personal plan to handle these unexpected occurrences. Remember: The only way we can improve our safety awareness is by demanding a deep commitment from ourselves and others. Proactively! ★



Brig Gen Eugene E. Habiger
HQ SAC Inspector General

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Combat Crew

Magazine of the Strategic Air Command — 37th Year of Publication

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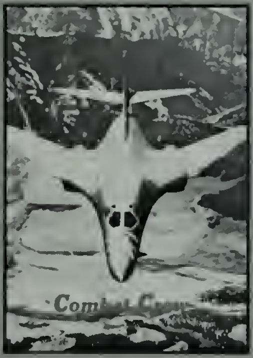

ON OUR COVER

What's it really like to fly SAC's newest bomber? Turn the page and discover how one B-1B crew describes their role in our nation's defense.

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COMBAT CREW is an internal publication of the Strategic Air Command with the primary purpose of promoting safety. The contents of this magazine are informative and not to be considered as directive in nature. Facts, testimony and conclusions of all mishaps herein may not be construed as incrimination under Article 31 of the Uniform Code of Military Justice. All names, dates and places used in conjunction with mishap stories are fictitious. Written permission must be obtained from Headquarters, Strategic Air Command before any material may be reprinted by other than U.S. Air Force organizations. Use of funds for printing this publication has been approved by Hq. USAF. Distribution FX, controlled by IGFE, SAC units submit distribution requests through local PDO. Reader to copy ratio one per combat crew; 10:1 for other SAC personnel. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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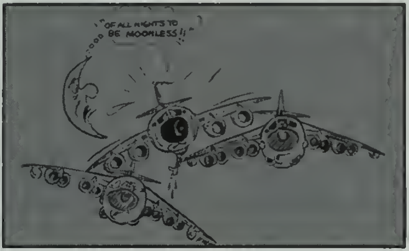
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Flying the B-1B As A Crew

Now that initial qualification training, Emergency War Order (EWO) certification, crew solo and our first alert tour in the B-1B are complete, crew R-11 finally feels confident enough to share its perspectives about the new jet with you, the most critical audience of all, SAC alert dwellers. Past articles about the B-1B have discussed the airplane from an individual's viewpoint, however, we want to tell you what it's like to fly the jet as a crew, and answer some of the more commonly asked questions about the B-1B with insights from and comparisons with B-52 and FB-111 aircraft. Here are some perspectives from each crew member. . .read on.

Aircraft Commander: It feels good to have a stick again! Strong commitment to the manned-penetrator concept, and love of the words written by John Gillespie Magee, Jr., make this airplane the best of both worlds. With three bays worth of punch, and a pole as sensitive as the T-38's, I've never enjoyed flying more! Working as a team has always been great for me, but the fast-paced nature of the B-1B mission, along with **total** crew involvement on the ground and inflight make this a crew member's dream.

Although I do miss being able to open a window, the large panorama, both to the front and sides, is superb. There is no need to open a window for cooling—even if we could—as the two on-board auxiliary power units (APUs) provide ample cooling air for equipment and bodies prior to engine start and during daily alert preflight. Even hot Texas afternoons are no match for the arctic air you can command with the twist of a knob.

Warming the cockpit is just as effective, although, after three years at Wurtsmith AFB, Michigan, I'm happy to admit that I haven't had much need for that feature here in Abilene. Noise levels in the cockpit are low, making communications on or off interphone a snap.

Remember your first takeoff in the T-38? Although takeoff distance is longer, there's not much difference here. Things happen quickly when the time to level off is measured in seconds instead of minutes. Our crew has seen 25 to 35 degrees nose high and accelerating. Is this really a bomber? The performance factors make you wonder, but taking this bird down low with the ears pinned back will convince you. The Offensive Systems Officer (OSO) will describe more of our capabilities low level, so all I can say is that this is one bombing machine. Airspeed, center of gravity and lift relationships, sweepback, and the Structural Mode Control System (SMCS—our canard vanes), made me a believer that this platform was **optimized** for high speed, low altitude flight, with a guaranteed smooth ride. With crew pacing based on "time to go"

Crew 11, 96 BMW, Dyess AFB

(TG), speed isn't readily apparent . . . unless you happen to catch a glimpse of your shadow racing beside you at 530 knots. No time to ask for a reminder of turn direction after TG zero. Low altitude turns are planned at thirty degrees of bank, with a smart roll rate and no delay, if you plan on staying in corridor.

Behind the tanker, the B-1B is just as responsive. Gone are the days of aerobic workouts with the yoke. One instructor likens inputs on the stick to balancing a dime on top of the trim button-not too far off! Of course, the view is great; everything is there with only minor modifications to references used in the B-52. Director light out and limits are no-brainers with the multi-colored boom, front and center. After having my proficiency declared, it was time for the pilot to try some refueling. Try? Heck, first time out his contacts were more than adequate to get the gas.

You'll like this jet in the pattern, too. Even the guys in back seem to enjoy our closed pull-ups. Using blowers, with the gear, slats and flaps left down, our inside circuit is about the same ground track as a T-38. Instruments are well suited when the weather requires them, and simulated emergency procedures in the pattern are straightforward. Everybody up front wants to fly—which brings us to one sticky area . . . seat changes. The tight cockpit and sticks that don't stow make seat swaps difficult, but not impossible or unsafe. When it comes time to let someone else in your seat, you will be pleased to know that the instructor pilot seat is . . . yes, comfortable.

Pilot: As a pilot in the B-1B, I am tasked with the traditional pilot duties. The big difference is the paperwork involved. Innovative mission planning techniques, combined from both the B-52 and FB-111, have reduced the amount of inflight and mission planning paperwork that must be accomplished. The addition of a flight data recorder that tracks the aircraft's flight phases eliminates the dreaded "Blue Dot" form. This definitely makes me feel more like a pilot than an inflight secretary, giving me more time to concentrate on the fun part of my job—flying the jet.

When I first entered the cockpit, I wondered where I would put everything. There is not much room except for what is required inflight: a checklist on one leg and kneeboard on the other. The only storage bin accessible to the pilots inflight is just big enough for approach plates and a condensed version of section III of the Dash 1. Overall, the cockpit layout is very well engineered. About the only difference between the two seats is the side of the aircraft you sit on, making transition from one seat to the other relatively effortless.

> **"Things happen quickly when the time to level off is measured in seconds instead of minutes. Our crew has seen 25 to 35 degrees nose high and accelerating!"**

Actually, flying this bird is easy. The most difficult part was learning the individual systems and how they are interrelated. The four basic systems, electric, hydraulics, fuels and bleed air, all operate independently, but their interrelation makes malfunction analysis challenging.

Flying the B-1B is an exciting challenge and I am proud to be part of it. Many aspects of the B-1 mission are still evolving. Being on the leading edge of the program has given our crew a once-in-a-lifetime opportunity to help a new weapon system mature and realize its full potential.

Offensive Systems Officer: From the navigation viewpoint, I've flown just about every recent SAC bomber—the B-52D's (ASQ 48 and DBNS), B-52H's (ASQ 38), FB-111A's, and now the B-1B Offensive Avionics System (OAS), (B-52 OAS is the notable exception). Some similarities exist in all of these systems. The B-1B OAS incorporates many of the best features of each system. As one might expect, speed and automation are the key ingredients to this new system—and for good reasons.

Currently, we cruise through low-level at 530 knots and we'll be cleared to go even faster in the near future once aircraft testing is complete. Gone are the days when you could eat your flight lunch IP inbound. Also missing are navigator and gunner inputs to help in radar scope interpretation (RSI) and backup timing. A typical run through LaJunta bomb plot lasts less than six minutes from initial point (IP) to end maneuver area (EMA). From rollout at the IP to the first target, we usually have less than two minutes. Additionally, almost two and one-half minutes of that bomb run is cruise from the last target to the EMA! In contrast, a B-52 would take some three and one-half minutes from rollout to release and four and one-half minutes from the last target to EMA.

To help counter these problems, we have lots of automation. For starters, the B-1B has the best Inertial Naviation System (INS) I've ever seen. In addition to the INS, the high resolution radar merits comment. How would you like to aim at one corner of a road intersection, or the corner of a chain link fence? In the B-1B it's quite possible. However, don't forget to bring your RSI. When using the lowest range available, there is only 3,600 feet from the top of the radar scope to the bottom. Even with precise placement on the prior aim point, more than an inch of crosshair movement may be required. For the old head bombardiers, this is a lot of movement—yet it represents only 150-200 feet in the B-1B. While the actual bomb scores are classified, my scores in this aircraft are a whole lot better than ever. In other words, our bombing capability is the best I've ever seen!

Several other features help in the speed and accuracy arena. Selection of automatic bomb door opening/closing, and automatic tone activation are at my command. No more fumbling to get the bomb scoring tone on prior to release. Additionally, automatic aircraft steering refines the last couple tenths of a degree in bomb aiming. We also have auto-throttle and automatic terrain-following, which help us to get directly over the target at precisely the right height and time. While most of these B-1B capabilities are not new, it is the first time they've all been put into one package.

Defensive Systems Officer: As the defensive systems officer (DSO) I have much greater responsibilities in the area of crew coordination than in the B-52. It starts with attending target study on mission planning day, covering times, headings, and enroute altitudes on our low-level route. Later, inflight, while monitoring the simulated threat environment, I'll back up navigation by using the threat situation format (TSF) display. This is similar to the B-52's three inch warning receiver, ALR-46, but is displayed on one of two electronic display units (EDUs), about the size of a 10-inch television. The other EDU is usually used in the panoramic format (PF), similar to the ALR-20A. The advantage of the TSF is the addition of course lines for the present and next navigation legs. To navigate using the TSF is very simple; turn the jet until the next destination point is at the twelve o'clock position and you're on your way.

With the integration of the flight parameter indicator (combination altimeter and airspeed indicator), an attitude indicator, and the prime navigation data on the multifunction display (MFD), I can adequately perform all necessary navigation functions. After flying the B-52 for the last several years, it is really a joy having the equipment to know where we are going and how long it will take to get there.

Some of the other pieces of gear available to the DSO are the high frequency radio, the satellite communications system, and probably the neatest of all—the central integrated test system (CITS). CITS is made up of an independent computer, monitoring several data-acquisition units, tied with thousands of sensors throughout the aircraft. Through these components, equipment operation information is relayed on virtually every aircraft system. Not only does it provide the status of individual systems automatically, but I can query specific component status through coded inputs. For example, when the hydraulic system caution lights illuminates at the pilot station, the CITS near-English message states "HYD PRESS LO." The message is clear on the type of malfunction, but to see exactly what is affected we can check the system pressure, quantities, master and slave pressures on all four independent hydraulic systems through the proper codes. The recording of this information in the aircraft forms gives our maintenance folks some hard data to help with troubleshooting when we get back to home station. CITS, in the automatic mode, records these malfunctions on both magnetic and paper tape along with an inflight time mark to help locate what happened and when. Both the forward and aft stations have a record initiate switch that enables the crew to "snapshot" the systems instantaneously to aid our maintenance technicians.

These tasks keep me busy inflight but are not my primary duties. As my title states, defense of the aircraft is the reason I'm here. I've already mentioned the PF and TSF. The rest of the electronic countermeasures system (ALQ-161 in the B-1B) includes: 1) a power panel for the transmit function, tail-warning function, and expendables (chaff and flares); 2) the integrated keyboard (IKB); and 3) the radar-frequency-surveillance/electronic-countermeasures (RFS/ECM) panels. To keep this on an unclassified level, suffice it to say this is where the computer commanded, automatic receive-and-transmit functions are controlled. In place of the dozens of panels in the B-52 with numerous controls on each one, we use a single power panel to turn the computer on. Sensor inputs or the operator then tell the computer how to handle power outputs, receiver sensitivity and expendables. Neat stuff when compared to our predecessor, the B-52. If you're looking for a fast-paced, well-informed, challenging way to earn back your navigator wings, being a B-1B crew member is a great place to do it.

Crew R-11 is proud to serve in SAC's newest bomber and we are confident in our abilities as a crew and the capabilities of our jet. Built to deliver lots of weapons, low and fast—the B-1B does its job better than you could ever imagine. Come see for yourself, climb aboard and join us. Your opportunity could be only a Form 90 away.

96 BMW, Dyess Crew R-11: AC Maj Hiram Payne; P Capt Tom Tomaras; OSO Capt Jim Meier; and DSO Capt Ric Mayer.

Linebacker II — Past is Prologue

Linebacker II, or the "Eleven Day War" as it is often known, took place in December 1972. At that time, SAC people did a heroic job of putting together a massive effort that played a key role in ending the war in Southeast Asia. It is a rich piece of history that SAC people can be proud of.

Lt Col Michael J. Kehoe

Often, commentators claim that new wars are begun with weapons and tactics that concluded the previous war. Today, we're flying the same aircraft but almost all experienced combat veterans have either already left the Air Force or are near retirement. Only a senior few are left in our operational units. Therefore, Linebacker II is more than a story; it is an important opportunity to share military history and the evolution of tactics as well as an opportunity to learn from the experience of others. Hopefully, new people can enter the next war with the best of the old tactics, not just the same old tactics.

The story begins in the spring of 1972. SAC B-52G and H model crews were at CONUS bases training and pulling alert. Some crews were TDY to U-Tapao air base in Thailand flying combat missions in the B-52 ARC LIGHT operation which has been ongoing for many years. Nearing Easter

weekend, the North Vietnamese and the southern insurgents launched a major offensive. SAC responded by sending almost all B-52D and B-52G aircraft and crews to Andersen AFB, Guam. Operation BULLET SHOT was born and within days of notification, crews and aircraft were on their way. Those who didn't fly B-52s to Guam were flown there by C-5s and C-141s, while others arrived on commercial flights under MAC contract.

Most of the crews were flying combat missions within four or five days of the first warning to deploy. TDY periods were 179 days with a break, then another 179 days. The war settled into a routine pattern — set routes and tactics; all high altitude bombing and bomb runs were aborted by a surface to air missile (SAM) threat. Later in the year, orders were changed to "press on" despite the many threats in North Vietnam.

Secretary of State Henry Kissinger was negotiating a peace agreement and in October 1972, announced that "peace is at hand." Since the bombing continued for a month and a half, everybody realized something had gone wrong with that hope. When a stand down from flying activities was announced on December 16, crews quickly learned that Linebacker II, a massive three-day effort into the heart of North Vietnam would begin on December 18.

On the first night, 129 bombers flew to targets in the Hanoi area. Fifty-four G models and thirty-three D models from Andersen and forty-two Ds from U-Tapao were organized into three waves of numerous three-ship cells. This tactic itself was a remnant of WWII. Time between waves was four to five hours and the route was essentially the same for all aircraft — north through Thailand and Laos, southeast to Hanoi then a westbound sharp post-target turn (45 degree bank turn) off the target back into the friendly skies of Laos. Also, SAC headquarters directed no maneuvering from the IP inbound in order to achieve the greatest accuracy around population centers and for cell integrity and mutual electronic countermeasures (ECM) support. Literally hundreds of SAMs were fired and MIG warnings were called constantly. The final score for the night was two B-52Gs and one 52D down, two 52Ds took battle damage and a B-52 gunner got one MIG.

In the 11 days of Linebacker II, 58,000 bombs were loaded for 729 sorties flown against 34 targets.

Nights two and three were largely a repeat of December 18. Routes and altitudes remained the same with B-52s lining up from the northwest into Hanoi like ducks in a shooting gallery. Crews were upset about the similarity and repetition of routes. Tactics began to evolve and crews were allowed to maneuver up to release. There were no losses on the 19th, but the greatest one-day loss occurred on the 20th. Routes were narrower than the first two days and over 220 SAMs were fired, downing four Gs and two Ds.

As the three day effort was extended indefinitely, the effect of ECM became very apparent. Half the Gs were modified with a more extensive ECM package and on the third night all four Gs that had been lost were unmodified. Also, the wisdom of the sharp post-target turn came into question due to ECM antenna patterns that lost effectiveness as the aircraft banked nearly perpendicular to the ground.

For the night of 21 December, tactics were changed substantially. Tactics and sorties were varied and release times were compressed to confuse the defense. Also, certain cells overflew the target without making a combat break, and then egressed over the Gulf of Tonkin. Only the Ds from U-Tapao flew that night; two aircraft were lost.

Raids on the night of December 22, 23 and 24 were very similar. Thirty sorties were flown each night against targets in the Haiphong coastal area. During these nights, cells divided along different tracks to the target, some even staged a feint toward a false target and timing tolerances were compressed to virtually zero in order to provide simultaneous times on target (TOTS). Also, post-target maneuvers varied with aircraft taking many headings to multiple exit points then reforming at a departure point on a common route. This resulted in saturation and confusion of area defenses, resulting in no losses in 90 sorties.

After a Christmas stand down, tactics were so different that it would be difficult for the uninformed to recognize the profiles as part of the same campaign as the week before. As a result, the crew force was charged with emotion and renewed enthusiasm. There was renewed confidence in the planners who used multiple axes of attack, varied altitudes and diverse withdrawal techniques. However, these tactics required precise navigation and time control that had never been practiced with such large numbers of aircraft in so close proximity.

The final phase began with 120 sorties on December 26. Ten waves went against nine target complexes. Seven waves had the same TOT and all strikes were complete within fifteen minutes. Two waves had targets within three miles of each other and 72 aircraft converged simultaneously on Hanoi.

During the phase from 26-29 December, other tactics innovations were implemented. For instance, G models with less capable, unmodified ECM equipment avoided the more heavily defended Hanoi area. Two ship cells were determined to be more vulnerable and if for any reason a cell found itself with two members, it reformed into a four ship or five ship cell for better mutual support. At all times, innovative confusing tactics were emphasized. Some targets were attacked from reciprocal tracks and egress routes crossed each other. Various altitudes were carefully planned for diversity, and to accommodate crossing tracks. This all resulted in saturation of the defensive command and control system with two losses in 300 sorties — two-thirds of one percent.

Overall, Brig Gen James R. McCarthy, then commander of the B-52D wing on Guam stated that "in the space of eleven days, we completely revolutionized many modern day bomber tactics." In those eleven days, 58,000 bombs were loaded for 729 sorties flown against 34 targets. Results were 1600 structures damaged or destroyed, 500 rail lines cut, 372 rail cars damaged or destroyed, and 80 percent of all electrical power production capability destroyed. On the other side, 900 SAMs were fired, 24 achieved hits, and 15 B-52s were downed for a loss rate of 2.06 percent.

This review of the "Eleven Day War" raises a few issues for us to think about, one of which concerns the evolutionary nature of tactics. We should learn the lessons of history and learn from the mistakes of others. Certainly, there are similarities and dissimilarities between Vietnam tactics and those of the eighties. It's difficult to see which should be retained and which should be disregarded. Some tactics to think about are day versus night, single ship versus cell, rules of engagement and mutual support in addition to individual aircraft tactics. However, the importance of ECM was clearly brought out and it's even more important today, as is diversity and multiple axes of attack within the constraints of mutual ECM support and simultaneous TOTs.

Above all, one lesson comes out loud and clear: know your stuff and be prepared. We all understand that the SIOP can be executed at a moment's notice. However, with the current emphasis on conventional operations, you could be flying a conventional mission with very little warning just as those people did in the spring of 1972. Know, think, and learn today's tactics.

A B-52D recovers at Andersen AFB following a successful Linebacker II mission over North Vietnam. Note the empty bomb racks under the wing.

...Gold 11 stopped refueling...left two crewmen in Base Ops, didn't pay for the gas, didn't have a clearance, didn't align his INS and made an intersection takeoff...in near zero-zero weather...

Transoceanic Ordeal

SAC PERSPECTIVE

Here's the receiver's point of view of a fighter deployment; needless to say, it raises some serious questions. Virtually every tanker crew has been confronted with the challenge of "dragging fighters across the pond." Most of the time the weather cooperates and it's a routine flight. Note how the KC-10s handled the situation and compare it to your plan. For their timely efforts and superior airmanship the crew of GOLD 11 received the Mackay Trophy for 1986. Our thanks to **Approach** magazine for sharing this article.

Capt Rob Coopman, USMC

Our squadron was planning a TRANSLANT to Bodo, Norway, via Lajes, Azores, to participate in the Anchor Express Exercise. The original plan was to send 15 A-4s split into five plane cells; each cell paired with one KC-135 tanker. The A-4 cells would launch one hour apart from Cherry Point and join the KC-135s near Long Island, entering the first air refueling track. The KC-135, with five A-4s in tow, would then follow the northern route, tank a second and final time south of Newfoundland, then continue to Lajes.

Fuel planning played a key role. Lajes is one of only five locations in the world designated an "Island Destination," which qualifies it for special weather and fuel planning criteria under Air Force regulations. These regulations allow a TRANSLANT flight to launch with destination and divert weather forecasts at or above 1000/2. In effect, your destination is also your alternate, so you don't need the standard 3000/3. Additionally, the aircraft being tanked must arrive over the island destination with one hour of holding fuel, and the tankers must arrive with two hours of holding fuel. Extra fuel to make the continent would not be available.

Our first TRANSLANT attempt ended with our 15 A-4s diverting off the first air refueling track into Pease AFB in New Hampshire. Eleven of the 15 A-4s were unable to receive fuel due to excessive spray around the probe during linkup with the basket; the reason for the spray was not apparent, and the problem is still being studied. We flew back to Cherry Point to regroup and try again a week later with SAC KC-10s.

The day prior to the new TRANSLANT, a KC-10 instructor pilot from Seymour Johnson AFB gave the squadron a rundown on the KC-10's capabilities which included worldwide communications through a command and control center at Langley AFB. He assured us that the KC-10 would always have the latest Lajes weather. Next, the Aerial Delivery Group (ADG), which was responsible for the movement, gave each TRANSLANT pilot his own computer-generated flight log booklet and strip charts. These booklets were beautifully assembled and included divert criteria for each member of the flight. The combination of the KC-10 brief and the fuel log booklets gave me the same "it's too good to be true" feeling I get when I listen to financial planners. We felt we were in good hands. All we had to do was join up, shut up and hang on.

It was tough to get a good night's sleep with all the excitement of the next day's transoceanic flight and our alarms set for 0130, so I doubt many of the A-4 drivers felt well rested when we met at 0300 for the weather brief. The forecast weather for Lajes was 4000/7, and the divert fields were also good. "It looks like a go," the ADG rep said.

The first cell of A-4s, Retro 61-65, launched in the dark at 0500. They joined their assigned KC-10, Gold 11; but unfortunately, three of the A-4s had assorted problems, and the Retro 61 flight diverted into Pease AFB.

Gold 11 elected to stay airborne and pick up the second A-4 cell, Retro 71-75, which had launched just prior to daybreak at 0545. One of these A-4s went NORDO, so a section returned to Cherry Point. Now, Retro 71, a flight of three, joined with Gold 11 and proceeded to Lajes with a weather update.

Back at Cherry Point, ADG approved the addition of a sixth A-4 to the third cell, which launched as Retro 81-86 at 0715 and joined with Gold 21 as planned but without the extra onload for the sixth A-4. All members of the Gold 21 and Retro 81 flight also continued without a weather update.

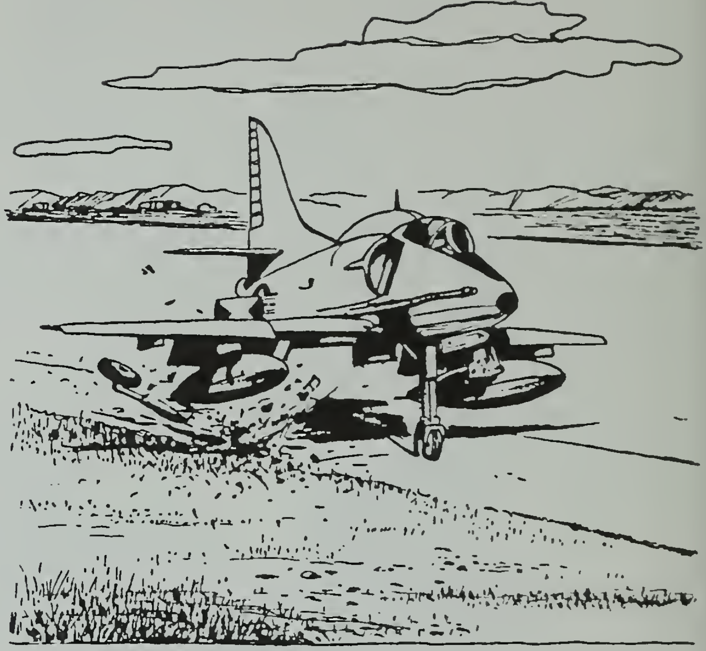
Question: What happens when one KC-10 crew and six A-4 drivers don't check the latest weather update?

Answer: The Lajes weather office starts sending out special amended weather updates forecasting the sort of weather that, if you knew about it, would convince you to divert.

Gold 11 made radio contact with Lajes ACT approximately 200 NM out. The weather was reported as 500 overcast, one mile in fog. Gold 11 detached Retro 71-73 for individual PAR approaches. Gold 11 held 20 NM south of the field while the A-4s attempted their individual approaches.

Gold 11 attempted to contact Gold 21, who was 45 minutes behind with six A-4s, to divert them to Newfoundland. Radio contact was never established. Meanwhile, the Air Wing Movement Control Officer, noting the situation, called a Marine KC-130 crew at the Lajes BOQ and told them to prepare for an emergency launch to save the A-4s. The KC-130 crew was airborne in 40 minutes. Their biggest obstacle was finding the plane on the ramp in the fog.

Just prior to Retro 71-73's approaches, a civilian Boeing 707 executed a missed approach and reported the field zero-zero. Following the Boeing 707, Retro 71 miraculously landed during a momentary break in the weather. The fog was so thick that Retro 71 had trouble taxiing off the runway. The follow-me truck almost ran into him. After Retro 71 shut down, the ADG rep told him he was sorry, but it looked like his two wingmen were going swimming.



". . .He veered off the runway, hitting the VASI lights which sheared off the right main gear."

Retro 72 and 73 did not break out at decision height and rejoined with Gold 11 for emergency refueling. The ADG Command Center directed Gold 11 and Retro 72 and 73 to divert to Rota, Spain and meet a strip alert KC-10 launching from Zaragoza, Spain, for refueling enroute.

In the climb, Gold 11 figured his fuel and informed Retro 72 and 73 that he didn't have enough fuel to give them and make it to Rota himself. Gold 11 said he would give each A-4 1000 pounds at a time to keep the A-4s airborne until joining with the strip alert KC-10. Gold 11 asked for the A-4's optimum cruise altitude and airspeed. This raised an interesting question. If you're 1200 miles from your divert without enough fuel to make it halfway, and a tanker is launching to meet you, do you fly max range or max endurance? The flight elected max endurance.

Two hundred NM east of Lajes, Gold 11 was informed that there wasn't a strip alert tanker enroute and that Santa Maria, located 150 NM southeast of Lajes, was the only place to land. Gold 11 with Retro 72 and 73 turned around, headed to Santa Maria, and discussed the options. Santa Maria has no TACAN or VOR, just a published VHF-ADF approach and the weather was going down. The A-4s had no compatible NAVAIDS and could not talk with the controller because the A-4s were UHF only and the Santa Maria controllers VHF only. Gold 11 agreed to make one or two approaches with the A-4s on his wing. Retro 72 and 73 decided a section landing was appropriate considering the deteriorating weather.

Just after Gold 11 began the ADF approach, a Navy A-3 pilot who had just diverted into Santa Maria and was listening in, advised Gold 11 of an unpublished ILS approach frequency. On the approach, the flight encountered thick clouds, fog and heavy rain that almost completely obscured the KC-10. Just above decision height the KC-10 broke out with both A-4s in section on the right wing. The KC-10 executed a missed approach. The A-4s called their sides of the runway, but Retro 73 detected a heavy crosswind and also executed a missed approach. He advised Retro 72 to land alone, which he did safely.

Fortunately for Retro 73, Gold 11 had air-to-air TACAN capability that aided in the join-up once on top. The second approach ended with Retro 73 safely on deck, and Gold 11 landed safely on a third approach.

Gold 11 taxied into the line at Santa Maria and immediately started to refuel. He knew Retro 81-86 and Gold 21 were now holding over Lajes in a fuel-critical state.

When Gold 21 came within 170 NM of Lajes, he received the weather as zero-zero and passed that info to the Retro 81 flight, who at first thought Gold 21 was joking. Gold 21 and flight were also informed that Otis 75, a KC-130, was launching from Lajes to drag the six A-4s to Rota, Spain.

Retro 81 entered holding over Lajes at max endurance awaiting Otis 75. When Otis 75 broke out above the cloud deck, the six A-4s joined and began refueling. Gold 21 departed and headed for Rota with just enough fuel to make it.

The pilots of Retro 81 and 82 displayed outstanding airmanship plugging the KC-130 at 160 KIAS in a climb. The other wingmen followed suit as must-plugs. The KC-130 offloaded its entire 30,000 pounds of give-away fuel but everything was not okay. Otis 75 didn't know about the plan to go to Rota and didn't have the fuel to do it. Fortunately, Gold 21 was still monitoring the frequency, so he turned around and rejoined. As a result, Gold 21 no longer had the fuel to make Rota.

Santa Maria ATC passed to the Gold, Otis and Retro flight that Retro 72 and 73 had landed successfully at Santa Maria and the weather had improved to 600 overcast, 2.4 miles visibility with a 12-knot crosswind.

At this point, Retro 81 decided to split his flight for approaches into Santa Maria. Retro 83, 85 and 86 went with Otis 75, and Retro 81, 82 and 84 joined with Gold 21 to follow the Otis flight.

In the descent, Retro 85 requested two approaches into Santa Maria. Otis 75, however, said he was now fuel critical and asked that the **three A-4s** land on one approach. For the approach, Retro 83 and 86 were on Otis's left wing, and Retro 85 was on the right. During the approach, the flight encountered the same bad weather that Retro 72 and 73 had experienced. About 10 feet above decision height, the flight broke out, and the A-4 drivers called the runway environment in sight. Otis 75 went missed approach. Retro 83 and 86 were in the lead maneuvering for a section landing. Retro 83, who was leading, felt high and close after breaking out and started a rapid descent. He then realized the runway was on top of the cliff ahead, added a lot of power, flattened out and landed safely, as did his wingman.

Retro 85 had difficulty getting separation behind the section, so he 'S' turned to the left, then turned right to realign with the runway. The overshooting crosswind was not in Retro 85's favor. Despite setting down on the numbers with 20-25 degrees left wingdown, he still had a right drift and landed 15 degrees off runway heading. As a result he veered off the runway, hitting the VASI lights which sheared off the right main gear. The pilot stayed with the A-4 until it came to rest on the right drop-tank and then egressed uninjured. However, Santa Maria tower called the runway closed because parts of the landing gear were scattered on the runway. Additionally, the Santa Maria weather had deteriorated to zero-zero.

Otis 75 started its slow flight back to Lajes and managed to break out on approach during a lull in the weather.

Gold 21 and Retro 81, 82 and 84 were becoming dangerously low on fuel. Gold 11, who had been on the deck at Santa Maria, saw the situation clearly: if he didn't launch quickly there would be some A-4s and possibly a KC-10 in the water. So Gold 11 stopped refueling, pulled away the ladders, left two crewmen in Base Ops, didn't pay for the gas, didn't have a clearance, didn't align his INS and made an intersection takeoff in front of the mishap A-4 in near zero-zero weather.

Gold 11 joined and refueled Gold 21 and Retro 81, 82 and 84, saving the day (for the moment). But still, none of the aircraft had the fuel to make Rota. Fortunately, there was now a KC-10 enroute from Zaragoza. It was dark by this time, but the join-up was successful, and both of the KC-10s and the three A-4s successfully tanked. This was especially significant because the Retro 82 and 84 pilots had never refueled at night. They all made safe landings in Rota. Retro 81, 82 and 84 set a new record for the longest flight in an A-4: 10.0 hours—and in a dry suit, no less. The day ended with the A-4s in five different locations, but with everyone thrilled that no one was lost.

The Anchor Express Exercise was subsequently scrubbed for other reasons, and the A-4 crews never flew to Norway. I think the lessons learned were especially valuable at such a small cost. I expect that nine A-4 drivers, the Otis crew and the KC-10 crews will recount the story more than a few times.

Lessons Learned:

- Trust the wisdom of OPNAV 3710.7, and distrust the term "Island Destination." Make sure the tanker has enough fuel to give you so that you can reach an alternate.
- Always update the weather before it's too late, even if you have to divert.
- When you have the warm fuzzy feeling of overconfidence, reexamine your situation.
- Don't fly to Lajes without the gas to continue to Rota, or have a strip tanker waiting in Lajes.
- Air Force and Marine tanker pilots have the right stuff, as shown by the crews of Gold 11 and 21 and Otis 75.

Whew! This story had the makings of a first class disaster. Obviously, many command decisions were made to avert tragedy notably by the crew of Gold 11, who gets our Bravo Zulu, as does VMA 223 for sharing this tale.—Ed.

About the author. Capt Coopman flew A-4Ms with VMA 223, the last FMFLANT Skyhawk squadron. He is currently attending law school at the University of Florida and flies A-4s with Marine Air Reserve Squadron VMA 142 at NAS Cecil Field.
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Instructors: Get involved!

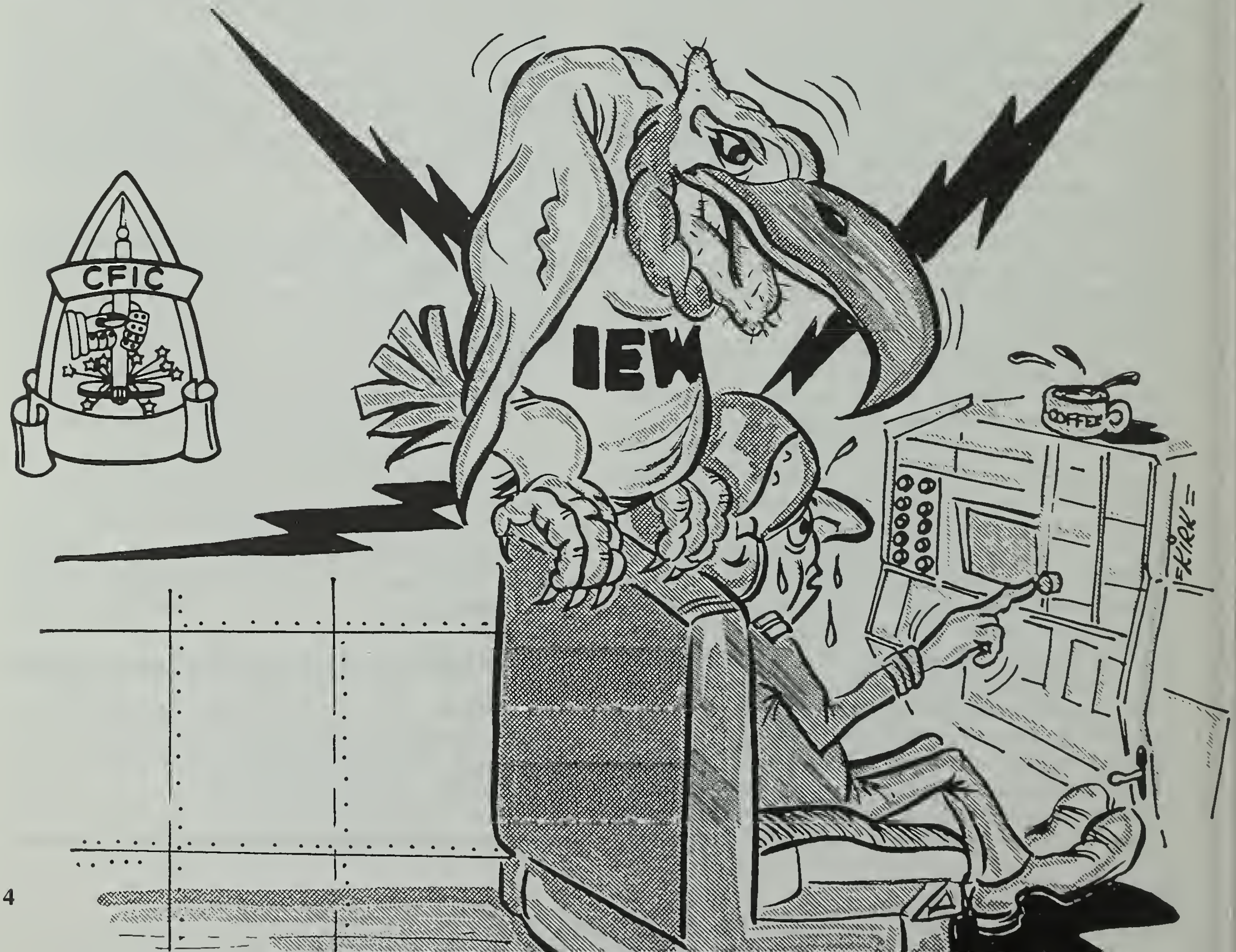
Capt Howard O. Triebold III
Deputy OIC, IEW Section, SAC CFIC

Since SACR 50-28 defines learning as a "change in behavior as a result of experience," effective learning requires active student participation. In order to achieve this, you, the instructor, have to develop a plan conducive to student participation. Following a plan produces success in the desired outcome. . .an individual able to perform his/her duty unsupervised.

In most cases, SAC instructors have a tendency to react to student deficiencies instead of planning for them. There are several methods instructors can use to avoid this trap. First of all, make reasonable assumptions about the student's knowledge. Develop good rapport and find out what a student knows. This is relatively easy to do with a crew member who's been at the unit for a while, but not so if the person is a new arrival from Castle, the rated supplement or another unit. For example, an arrival from the rated supplement probably has the basic "airsense", but has forgotten some finer techniques and may not have seen the newer equipment aboard the aircraft.

An additional method of making assumptions is to check the student's records. Training Accomplishment and Progress Reports (TAPR's) give follow-on instructors information on the student's ability to perform the specific tasks in the training program. Form 8's may be another available aid in formulating basic assumptions about the student's knowledge.

While formulating these assumptions, anticipate problem areas. Too many of us expect everything to go wrong. If you treat the student as if everything he/she does is wrong, you'll end up doing one of two things: doing the student's job or creating an intimidating and embarrassing atmosphere. Either way you're not



achieving the desired outcome. Again, by reviewing TAPR's and other forms, you can determine the "significant" areas, or student deficiencies. Once you have identified these areas, you can focus your plan based on these deficiencies while leaving the "proficient" areas alone.

The final point in developing your plan is more a reminder than anything else. You, as the instructor, are responsible for your student's safety and actions. This places a great deal of responsibility on your shoulders. You know students will follow your example. If you don't show interest in the basics of flying, safety rules, procedures and tactics, your student won't either. Furthermore, if you don't show a basic interest in your student's success, you can be sure that the student will not be interested and subsequently will not succeed.

Now we have the basic tenets in developing a plan: making **valid** assumptions about performance, anticipating significant problem areas, and setting a good example. So you're ready to instruct your student, right? Well unfortunately, most plans look good on paper but they fall short of the goal when put into action. It falls upon our "instructor" shoulders to determine why the outcome was less than desired. Most cases result from inadequate planning or unexpected contingencies. In some contingencies such as maintenance delays, we have no control, but in cases where inadequate planning for student performance has created a shortfall you can, and must, correct the problem.

The first question you must decide is, "What exactly is the problem?" This basic step in problem solving is important to us as instructors. If your definition of the problem is vague, then you'll spend more time trying to correct it. If you thoroughly analyze the task, however, and can define the problem down to the "gnat's eyelash," you'll find that the situation can be corrected with less time and energy. The analysis must be a quick, yet comprehensive breakdown so the deficiency can be immediately corrected. The only way to make this analysis is to have a good working knowledge of the task and know where the procedures are found. Thus, it's imperative to keep abreast of all changes to regulations, procedures and tactics, and be able to present the "new information" to the students.

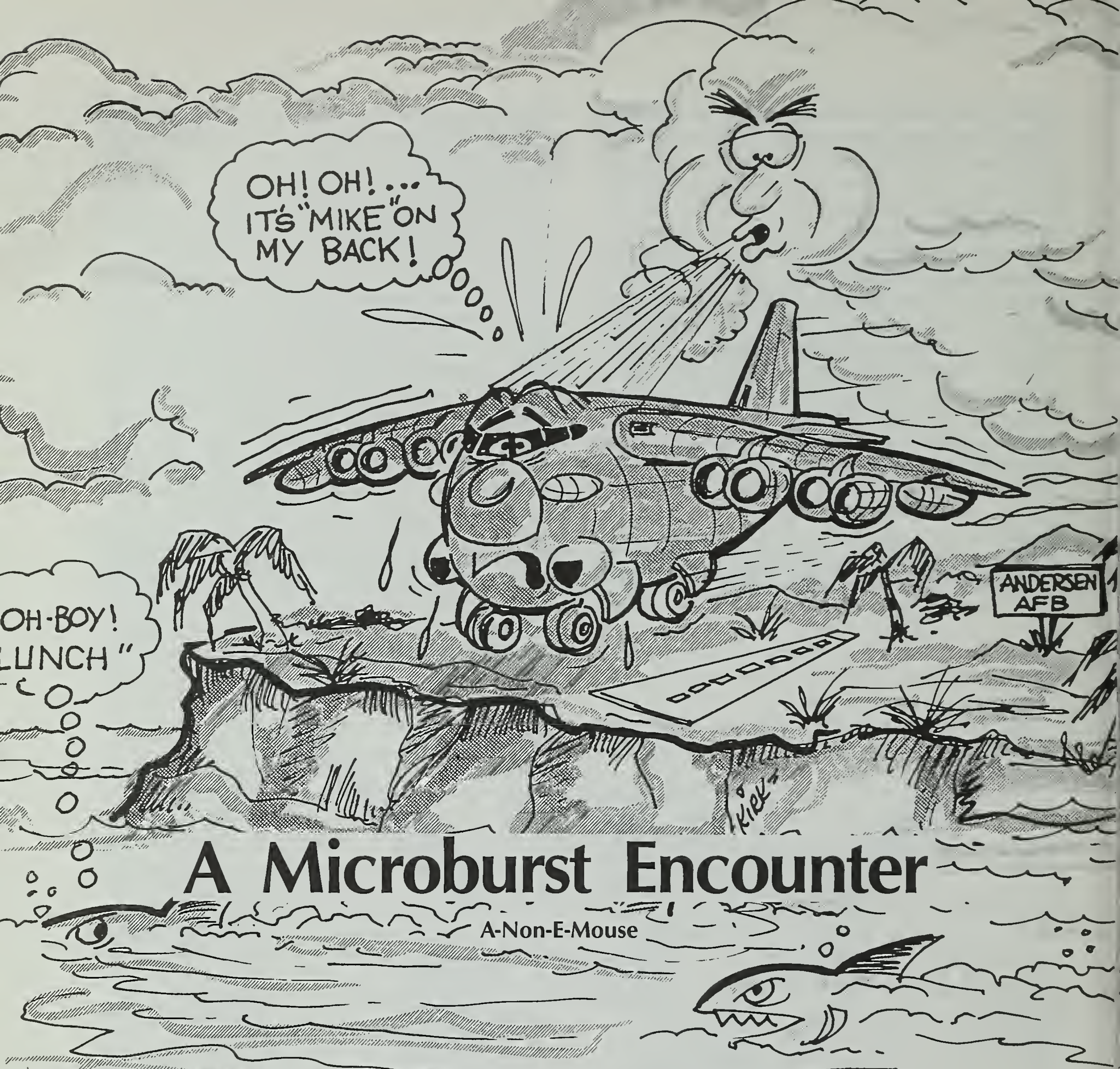
Once the problem has been defined, you need to provide a solution to it. Task analysis is very important because you must be able to determine **exactly** where the student erred and correct **that** step. An example of this is to have a doctor prescribe throat lozenges for a strep throat. The symptoms may be "treated," but the problem still exists. Only by accurate diagnosis can the correct medicine be prescribed to achieve the desired outcome. The same is true with instruction! Most instructors find that the more thorough the task analysis, the simpler the solution. Some solutions require only showing a reference to a procedure, while others may involve providing a technique to accomplish the procedure. In any case, provide the student with the correct solution and you're ready to move along.

Not so fast, though! That's only two steps and we all know that everything in the Air Force has three parts. (PME presentations [3 main points], checkrides - [mission plan, flight; critique], etc.) So here's the third; you must now evaluate your solution. Yes, you must see the student's performance change from the "gems of wisdom" you provided. This can be very satisfying or it can be the most frustrating time you've ever spent. Remember, though, flying is a psycho-motor skill. Yep, just like throwing a football, the correct nerve pathways must be exercised to achieve mastery of the skill, and this takes time. You may not see any immediate gains in performance, but that doesn't mean the student's not learning. Only by allowing and correcting the hand-eye coordination mistakes can the correct methods be achieved. The same is true of ear-eye-hand coordination required in threat identification and jamming for EW's.

However, if success does not present itself within a "reasonable" time, you're back to square one; defining the problem again! It may be that your analysis of the problem was inaccurate (throat lozenges) and you need to further analyze the task. This is what most instructors find, so redefine the problem and provide another solution to evaluate again. If this doesn't work, try a different solution, as there may be more than one way to "skin this cat." Finally, if all else fails, take a look at yourself and see if you may be the problem. If you're detracting from the situation because of your instructional style, get somebody else to teach the skill. This may seem to be demoralizing but what's more important, instructor ego or the student's performance? Chances are, if the student succeeds, you'll feel better about it than if the student failed because you couldn't provide what he/she needed.

The bottom line: Provide active instruction to your student. Being an instructor means caring about your students. If you're not actively involved, you're not showing the care necessary for student improvement. Remember, it's easy to evaluate, not so easy to instruct. Anyone can evaluate and criticize, but instruction is an art — the art of involvement.

About the author. Capt Triebold graduated from Penn State University in 1976 with a B.S. in Health and Physical Education and taught school in Titusville, PA, before being commissioned at OTS in 1979. After completion of UNT and Electronic Warfare Training at Mather, and CCTS at Castle, he was sent to Loring AFB, ME, as a B-52 EW. In 1984, he was reassigned to the CCTS as a flightline IEW and is currently a CFIC IEW and the division's executive officer.



A Microburst Encounter

A-Non-E-Mouse

The purpose of this article is to describe a microburst encounter that happened to my crew on 3 October 1986 during a typhoon evacuation from Andersen AFB, Guam.

Guam is a small, tropical island located 600 miles north of the equator in the Mariana Island chain (Rota, Tinian, Saipan, and about 12 others complete the chain). One of the unique characteristics about living on a tropical island is the suddenness with which a typhoon can form. Guam maintains Tropical Cyclone Condition 4 year-round. This means a typhoon can be expected anytime within a 72-hour period, and there is no surrounding land mass to slow down the fury of the approaching storm.

For aircrews, a typhoon is normally preceded by a telephone alert placing them in crew rest. Crews are also given time for the pre-takeoff evacuation briefing. The weather which precedes the typhoon is part of the bands which are feeding it and these usually bring lots of rain and strong winds. As the typhoon gets closer the sky darkens, and large torrents of rain slash through the jungle with ever increasing winds.

Taking off with an approaching storm is both challenging and dangerous. The day that we were to evacuate, we were to be number four in the first of four cells. We arrived at our aircraft to find it surrounded by an army of maintenance personnel who were working several engine problems. As we entered the aircraft it was already being rocked by the gusty winds and streams of water poured down from the overhead hatches.

After a 45-minute delay we were ready to taxi to runway 24R for our takeoff. The winds had already picked up and were just within our crosswind limits. Due to the maintenance delay, we had been slipped to number two in a two ship cell. The storm was rapidly approaching, and the takeoff schedule had changed to a free launch system (any plane capable of taking off was to launch as soon as it was able). The rain was coming down so hard that it was nearly impossible to see the taxi line. The dark overcast ceiling had already fallen to within a few hundred feet of the 612 foot airport elevation.

A runway 24 departure takes the aircraft over the jungle, whereas runway 06 ends at a 600 foot cliff (giving the crew minimum bailout altitude instantly). After a slight delay for more maintenance, our lead aircraft took the active and launched. We followed him slowly onto the active and took a few extra moments to ensure everyone was ready. Our actual launch time was four minutes after lead. Takeoff procedures were planned for a standard, dry takeoff with 190,000 pounds of fuel on board. With the exception of the decreased visibility and turbulence, the takeoff was normal. Only a few seconds after we broke ground we entered the clouds and continued to climb out. During the climb our plane was bounced around from the moment we got airborne and the rain continued to be heavy. We completed our flap retraction and stabilized at 280 KIAS. Climbout was normal until 3000 feet MSL (2400 feet AGL). It was here that we lost an instantaneous 30 KIAS and the aircraft stopped climbing. At first I thought we had lost some engines or I had pulled the nose up too high. A quick check of the instruments and a verbal confirmation with the IP told me that we had not lost any engines and all were set properly to NRT. I had the aircraft pitch attitude set at about four to five degrees nose high. However, the airspeed was still at 250 KIAS and we were now in a 1000 foot per minute descent. At this time I advanced all the throttles and pulled the nose up further to climb. The interphone was completely silent with the exception of the IP and myself. I asked the IP what was going on and told him we had flying airspeed. The IP suspected that my airspeed indicator had failed but after checking the copilot's airspeed indicator and the stabilizer trim setting, he discounted this possibility.

I decided that if we reached 1500 feet MSL, I would instruct the crew to bailout to give them a chance to survive, especially the IP and IN. These few seconds had already consumed 1000 feet of altitude and we were continuing downward. This was not my favorite part of the flight.

Everything felt wrong. The throttles were up, nose up, we now had 280 KIAS but we weren't climbing. I tried to raise the nose further to zoom the aircraft; even this did not help. The VVI still showed an increasing rate of descent. At 1700 feet MSL, the VVI was showing a 2000 fpm descent, leaving me only 200 feet to deal with. Finally, we started climbing out. I flew it on up to FL 270 and rejoined our lead aircraft.

After we returned home a few days later, I was filled in on a lot more information, and informed of what ground personnel saw. Immediately prior to our takeoff the weather shop advised the field of some severe weather off the departure end. We never received this information. As we entered the weather, operation personnel in "Charlie Tower" (our RSU) and the SOF said they were able to see our airplane's shadowy figure for the entire ordeal. They saw the plane climb away normally then start a descent. The descent was described as a "waddle" (right wing dips then left dips while we were descending). For the most part they could only see a shadowy form descending and none of them thought we would make it out. Several people commented that they were watching for chutes and hoped we would land in the jungle instead of the open ocean in the middle of the typhoon.

There is no question that we went through some very severe weather. Every B-52 that landed at the evacuation base (Kadena AB, Japan) had lost all of the paint on the leading edge of the wing and engines. The weather shop confirmed that a severe windshear, or more likely, a moderate microburst occurred as we started our climbout. My instrument gauges definitely confirmed that we entered an area where we had no control over the airplane's climb capability. The following cell, which took off approximately 10 minutes later, did not encounter any significant weather.

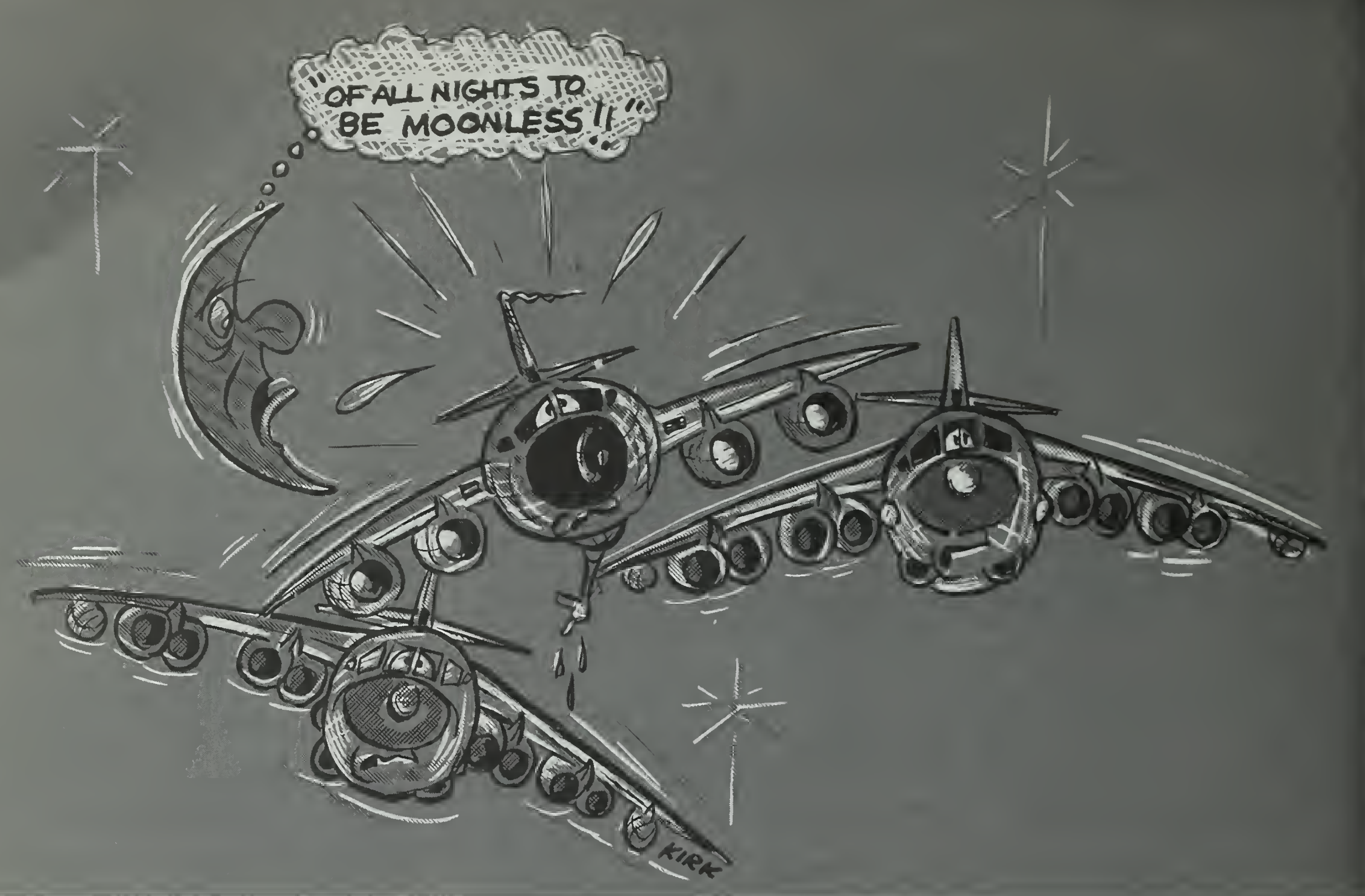
Had we been lower, slower, still retracting the flaps, or had the microburst been of greater intensity or duration, I do not think we would have had a chance. The power and nose were up and we were still falling.

We were lucky. We were already at 2400 feet AGL and 280 KIAS, with the flaps retracted, in a moderately light aircraft. Since that day I have read a little more about microbursts and agree that in a large aircraft your chances of survival are enhanced by flying skill and some measure of luck.

To quote August **Air and Space** magazine, "Microbursts are the deadliest form of 'windshear,' a term that describes any abrupt change in wind speed and direction. When the microburst's jet of air hits the ground, it blossoms out horizontally in all directions, like water from a hose aimed straight down onto a flat rock. An airplane flying into a microburst first encounters a strong headwind, then a downdraft, and finally, a tailwind that produces a sharp reduction in airspeed (the speed of air moving past the airplane) and hence a sudden loss of lift. The turbofan engines on an airliner produce an awesome amount of thrust, but their power may not be sufficient to accelerate the massive airplane rapidly enough to escape the forces that push it toward the ground."

Luckily, in my microburst encounter, I was able to think and act as I've always been taught. I "flew the airplane first" and handled the problem, while ignoring radio calls. In other words, aviate, navigate and then communicate. Had I decided to have the crew bail out, I do not think there would have been any survivors. The last few hundred feet of descent gave us enough flying time that we finally cleared the southern cliff line. At best we would have landed in the open ocean in the middle of the approaching typhoon; the IN and IP would never have gotten out. The same downward wind vectors from the microburst would have pushed us downward just as fast in our parachutes as they were pushing the airplane. I'm getting a little bit older, and I haven't practiced any 1000 fpm PLF's lately. Besides the obvious conclusion (not flying into a microburst), I learned one other item. Anyone who flies on my airplane keeps their seat kits beside them for the duration of the flight. In the past, I always let the gunner stow them neatly away for emergency use, but I found out that neither the IP nor the IN would have had the time to grab the kits on their way out of the airplane.

Microbursts are common occurrences that are not just associated with typhoons. In a surprise encounter, no amount of flying skill can help you if the microburst has a greater downward velocity than your aircraft can produce upward. I know, I was there.


"OF ALL NIGHTS TO BE MOONLESS !!"
KIRK

Three Ships That Passed in the Night. . .Barely

Capt Matthew F. Laiho
92 AREFS, Fairchild AFB

It wasn't until we rolled out heading down the refueling track that I realized how close we had come to a collision with one or both of our B-52 receivers. The events that occurred in rapid succession the seconds before our near-tragedy were just now coming together in my mind—the scenario made me shiver. I'll never know why not one person on any of the three aircraft had seen it coming.

Winter flying operations were in high gear the night of our flight and we had the usual minor maintenance problems during preflight; condensation inside the instruments, a faulty altimeter and some sluggish equipment. During engine start, the number one engine failed to rotate, but a few minutes of warm air persuaded it to start. After a few more minutes of warmup time for the generators, we were ready to taxi. It was one of those preflights where our time was whittled away by several minor problems—we were feeling pressed.

We thought our problems were over as we taxied to the hammerhead, but tower called a slight tail wind which required the pilot to recompute takeoff data. We took off five minutes late and shortly after breaking ground we found that the gear would not retract. After several tries it was apparent that the gear was not going to come up, so we obtained clearance to a holding fix to get things in order. At this point, it looked like the refueling would be cancelled.

Meanwhile, our two B-52 receivers were forming their enroute cell and getting their timing down for the enroute rendezvous. They knew that we were having a problem and that the refueling might be cancelled. However, they would wait at the ARIP and give us a chance to troubleshoot our problem. Twilight had faded and it was a moonless night with a high overcast above and low clouds obscuring any lights from the ground.

We approached our holding fix and the aircraft commander tried one more time to raise the gear—it came up, as if there had never been a problem. All of a sudden the mission was back "on." We had 50 nautical miles to gain 24,000 feet of altitude and by going direct to the ARIP, we could still make our timing and arrive one minute ahead of the bombers. ARTCC cleared us to climb to FL 270 (we were scheduled to rendezvous at FL 300), and the receivers to FL 285/290 respectively. The bombers were pleased to hear that the refueling was back on and informed us that they would be over the ARIP on time.

As we climbed, we sighted our receivers passing well above us, from right to left. A few seconds after passing over us they turned their cell to the south to make the timing good. Air-to-air TACAN showed the bombers at eight nautical miles. As the bombers rolled out southbound, the copilot rolled our aircraft into 30 degrees of bank for a right turn to the ARIP. ARTCC advised us that our receivers were at our eleven o'clock position for seven nautical miles.

Events progressed rapidly from this point on—so rapidly that we almost became a statistic. The aircraft commander saw some lights out his window that he thought were the receivers, but wasn't quite sure. ARTCC called the receivers at six nautical miles which convinced the aircraft commander that the lights he could see belonged to the receivers. We were just approaching FL 270, in the turn, when the aircraft commander told ARTCC that he had the receivers in sight **below** us and he was declaring MARSA. ARTCC cleared us for air refueling, the receivers called to find out where we were, and the pilot began to climb to FL 300. As we climbed from FL 280 through FL 290, the boom called from the boom pod on interphone that he had just seen a bomber pass right under us, and seconds later he called again saying that a second bomber had gone under us **very** close—inside one-eighth mile. Talking to our receiver pilots the next day we found that the number two bomber had passed under us with only an estimated 100 feet of altitude separation!

As we rolled out on course with our receivers at our three o'clock position, the cockpit was silent. A terrible tragedy had been narrowly avoided—by accident and not one crew member had seen it coming nor had taken any action to avoid it. It's obvious to anyone reading this article who was at fault, after all, the tanker is responsible for the safe completion of the rendezvous. Some of you probably think that a situation similar to this could never happen to you, but it can! No matter how good you are, it sometimes gets too busy for any one person in the cockpit. In our case, each crew member on the tanker could have said something or taken action to avoid the dangerous situation.

"Talking to our receiver pilots the next day we found that the number two bomber had passed under us with only an estimated 100 feet of altitude separation!"

Our crew learned several valuable lessons from this flight. The first is that it's important to **prioritize** what is vital anytime unusual things start happening on any flight. Our crew was behind the power curve from preflight on; throwing an emergency situation at us after several small time consuming problems set us up for a fall. Section III of the Dash-1 states, "STOP—THINK—COLLECT YOUR WITS," obviously good advice in this situation. Instead of rendezvousing with the bombers as briefed, it would have been better to accomplish a point-parallel rendezvous at the ARCP because we would have had more time to climb to altitude, and the bombers were willing to wait at the ARIP. Secondly, it's important to have good **position awareness** at all times. Not realizing that our aircraft was in a 30 degree bank turn caused the aircraft commander to be a victim of a dangerous optical illusion as he watched the receivers out his window and thought that they were below us, when they were actually above us. Climbing through the receivers' altitude, when they were so close, also points to a position awareness problem—everyone on our aircraft should have known the receivers' altitude. The third lesson is the importance of **mission planning** thoroughly, not only with your own crew, but with your co-located receivers. If we had known our receivers' routing to the ARIP and they had known ours, this dangerous situation may have never developed. It's hard to criticize anyone for spending extra time mission planning.

Our job is to fly "in close proximity" to other aircraft so it's our job to keep it safe. It's easy to get complacent during a rendezvous when you're accomplishing the procedure with a local receiver, on a local track that you have been on many times in the past. We can make our job safer for ourselves and fellow fliers by studying the regulations, flying accordingly, and ultimately by using our experiences and applying sound judgment to accomplish our missions. Three ships passed in the night. . .too close! Don't let it happen to you. **Fly smart. Fly safe.**

About the author. Capt Laiho is a 1982 graduate of Oregon State University. He is currently assigned to the 92 AREFS at Fairchild AFB, WA as a KC-135 navigator and squadron Flying Safety Officer. He is a graduate of OTS, Undergraduate Navigator Training and Combat Crew Training School.

On Course

Maj Ric Thiele
SIFC, Castle AFB

The most frequently asked question that we've received during the last three years at SIFC has been, "What is **on course?**" Those of you who have attended our course (or have called us) probably remember our standard answer, "It depends." This nebulous answer is more relevant to this particular question than any other question we receive. Actually, the question "What is on course?" started our standard "It depends" answer.

What I intend to do with this article is to explain what **on course** depends on. Actually, it wasn't until a couple of months ago that I figured out a way to explain it without involving hours of talking or reams of paper. We'll look at **on course** during the approach phase (where it is most critical).

AFM 51-37 states that after receiving approach clearance you must "... maintain the last assigned altitude and heading until established on a segment of the approach" (para 10-8b). When are you **established**? When you're **on course**. The easiest definition to use for **on course** is just what it says, **on course**. This is when the CDI (course deviation indicator) is centered on your HSI (horizontal situation indicator on most flight director systems) or CI (course indicator on other systems). Rather simplistic, but difficult for many to maintain 100 percent of the time. Additionally, this makes it difficult to comply with other action points on an IAP. If you can't climb, descend, turn, etc. until you're **on course**, and the CDI is not centered, you might put yourself in a situation where it's difficult to fly the approach safely. The longer it takes to be **established** the steeper the descent gradient to the next restriction will become. This easy definition may not be the answer.

All the old heads should remember when AFM 51-37 used to define **on course** for us. It used to say that as long as you were within five degrees (VOR or TACAN) or one dot deflection (LOC) you were **on course**. This was also simple and easy to decipher. The problem was that at times it was too restrictive (when you were close to the NAVAID) and other times not restrictive enough (when you were far from the NAVAID). Knowing (from AFM 55-9, TERPS) that on a non-precision final approach (TACAN or VOR) we have airspace protecting us from obstacles a minimum of one mile either side of centerline, we can compute our degrees of protected airspace. At three miles from the NAVAID we can compute (using 60:1) that one mile is 20 degrees in radials. That translates into two full CDI deflections. Five degrees (one dot deflection) is only one-fourth of our protected airspace. On the initial segment of an approach (where we are usually far from the NAVAID) we normally have four miles of protected airspace either side of centerline. Sixty miles from the NAVAID (one degree per mile) we would be limited to four degrees deflection of the CDI. Five degrees would not assure us of protected airspace. Upon realizing that five degrees was a poor definition, it was removed from the manual. Where did this leave us? For years pilots continued to use this definition, resulting in it being used as a procedural technique(?). Eventually **on course** was expanded by many to full scale deflection of the CDI. Still overly restrictive in some cases and not restrictive enough in others.

The current AFM 51-37 does have guidance for us to use in the statements, "Once a lead point is reached, and a turn to the next segment is initiated, the pilot may descend to the next applicable altitude restriction. This may be especially important to facilitate a reasonable rate of descent to final approach fix altitude." (para 11-4 and 12-4 NOTE). But you must remember, "... maximum designed obstacle clearance is based on the pilot's attempt to maintain the course centerline." (para 12-4 NOTE). Again, maximum obstacle clearance will be when the CDI is centered.

Without pulling out our well worn AFM 55-9 (TERPS), how can we know when we have obstacle clearance other than CDI centered? First, we must determine why our CDI is not centered. Let's not concern ourselves with poor pilot technique or proficiency problems.

What we need to look at are initial course intercepts and transitioning from one approach segment to the next. If we are attempting to intercept a course or are going from one segment to another, we should have precomputed a lead point so that we can roll out on course (CDI centered) at the completion of the turn. With this lead point in mind we must determine if other actions are required and/or desired when we reach the lead point.

Other actions usually mean a descent during an approach, but they can also include a hard altitude restriction or a climb on a SID! The first question we must answer is, "Do we have to descend at this point to safely fly the procedure?" If the required descent gradient at that point is minimal (less than 300 feet per nautical mile) we probably shouldn't be in a big hurry to descend. If the required gradient is greater, we should not delay, but descend at the earliest opportunity to prevent those steeper than normal gradients we mentioned earlier. This will be especially true at low altitudes. Therefore, if we must descend, we can consider ourselves **on course** and established on the segment when we reach our lead point. This should keep us well within the obstacle criteria mentioned in AFM 51-37 and AFM 55-9.

To summarize, **on course** is you attempting to keep the CDI centered on your navigation instruments. This will assure maximum obstacle clearance. If you **must** descend when you reach your lead point (you have decided the approach will be more difficult if you don't) you can feel assured that you will be safe. This technique will work whether you are flying an entire approach or are being radar vectored to a segment of the approach.

Let's look at several additional examples. You are flying a published penetration going from an arc to a radial with an at-or-above altitude restriction at the arc/radial intercept. When can you descend out of that altitude? If the descent gradient is less than 300 feet per mile, you can wait until your inbound course is centered on the CDI. If your descent gradient is greater than 300 feet per mile, you should start your descent when you reach your lead radial to turn off of the arc onto the inbound radial.

What if you're flying a procedure turn with a procedure turn altitude depicted? AFM 51-37 says, "Descend from the procedure turn altitude when the aircraft is established on the inbound segment of the published approach procedure." (para 12-2e). When are you safely established on this segment? If the descent gradient is not a problem, you can wait until your CDI is centered. If descent is a problem, the earliest you should descend is halfway through the inbound turn. This will equate to the lead point for a 90-degree turn to the inbound course. Remember, AFM 51-37 says, "The pilot must use position orientation and pilot judgment to determine when to descend while attempting to intercept the course." (para 12-2 NOTE 2). You must be assured that you are one turn radius from the course. This will involve computing and knowing the turn radius for the airspeed you are flying. For this technique to be safe, you must know where you are!

For a teardrop approach, AFM 51-37 says, ". . .descend from the turn altitude when the aircraft is established on the inbound segment of the procedure track." (para 12-4d(2)). The same rationale used above can be used to descend out of an altitude restriction depicted on a teardrop course.

Finally, what if you are being **radar vectored** for the final approach segment. AFM 51-37 says, "Once you receive approach clearance, maintain the last assigned altitude and heading until established on a segment of a . . . IAP. Use normal lead points to roll out on course." (para 10-8b). When are you on this segment? How about when you reach your lead point for your turn to roll out **on course**! Beginning to sound familiar? You can descend at this time if you are complying with a depicted altitude restriction and you have determined it would be to your benefit in safely completing the approach. If there is no hurry to descend, wait until the CDI is centered.

To put this in its final perspective, a safe technique to let you know when you are within the obstacle clearance area and can consider yourself **on course** is when you are within a normal turn radius of the course. This assures you of being within protected airspace. Remember, if you don't need to descend, don't rush into it. Altitude above you is of no use in remaining clear of obstacles. More questions — give us a call at autovon 347-4571!

Flameout at 50,000 Feet

Maj Bruce Jinneman
17 RW, RAF Alconbury UK

"Mobile, this is Dragonlady 25. . . my engine has just flamed out."

"Roger, Dragonlady 25. Say altitude and position."

"Okay, mobile, I'm passing through 50,000 feet and I'm about 55 miles northeast of the field." Sounds like all the ingredients for an interesting war story, doesn't it? You know—the kind saved for Friday afternoon when the old heads tell it like it really is. Unfortunately, it actually happened to me last year. Looking back now from the security of my Flight Safety desk, I've picked out a few "lessons learned" that I would like to pass along.

Before I begin, let me say that I'm not the sort of pilot who experiences an emergency every time he straps into a jet. (In fact, up until my flameout my worst experience revolved around being unable to get "Q" reservations at Nellis AFB on a Friday night and being forced to stay downtown.) Fortunately, during pilot training I had an instructor by the name of Manny "The Mad Dog" who used to pound into my head (literally) the three rules for dealing with an aircraft emergency: (1) fly the aircraft, (2) analyze the situation, and (3) take appropriate action. Manny, if you're out there somewhere reading this, let's take a look and see how your three rules applied to my emergency.

Fly the Aircraft

I was returning from a nine hour operational TR-1 mission over Europe. The flight had gone well and I was looking forward to landing at RAF Alconbury and stretching my legs. Unknown to me, a mechanical failure in my fuel system had trapped fuel in my outboard wing tanks. The first indication that something was wrong came three minutes prior to engine flameout. I'm not ashamed to admit that for a few seconds I almost panicked. I enjoy the ocean but bobbing around the North Sea in a spacesuit is not my idea of fun and games. Somehow my reflexes took over and I began doing things almost without thinking. I immediately stopped my descent and retracted all drag devices. When the engine quit I wanted to have a clean aircraft to give me maximum glide range. I would soon be losing all of my navigation aids so I did a quick check of the range and bearing to home base. A few seconds later the engine sputtered and died. I was amazed at how quiet it became in the aircraft. A max-range glide speed was quickly calculated and I adjusted my rate of descent. Only when I was sure I had the aircraft under control did I give a radio call to my mobile (SOF) at RAF Alconbury. (Okay, Manny, step one: "Fly the Aircraft" has been taken care of—what's next?)

Analyze the Situation

Once I was in contact with the mobile officer, he pulled out the TR-1 Dash One and read the emergency procedures to me. We quickly determined that trapped fuel was the problem and there was probably nothing I could do to correct it. Just to make sure we covered all possible actions, I attempted two restarts with no success. There were now two courses of action I could take: (1) glide to an uninhabited area and eject or (2) commit myself to a dead stick landing. I chose to return to home base and to try and get the aircraft (and myself) back on the ground. There were several reasons for this choice. I knew I had enough altitude to make it back to RAF Alconbury and set up for a flameout pattern. Secondly, the mobile reported that the morning's overcast had given way to a scattered layer of clouds. Finally, all U-2/TR-1 pilots practice simulated flameout patterns during every routine training mission. I felt that with the help of my mobile we had a good chance to get the aircraft back on the ground. Additionally, the option to eject was there if the flameout pattern didn't work out. By now my squadron commander was on the radio with the mobile. They both agreed with my decision to attempt a dead stick landing. We had now reviewed the situation and decided on a course of action. (Okay, Manny, step two is finished—what's next?)

Take Appropriate Action

Once the decision had been made to attempt a flameout landing at Alconbury, a well practiced game plan was put into action. I planned on arriving over the field with enough altitude to spiral down into the flameout pattern. Because of mission equipment, the aircraft was heavier than normal and was coming down at almost twice the expected descent rate. I decided to raise my high-key point by 1000 feet to compensate. Gear extension would be held off until the last moment to reduce drag. Flameout pattern airspeeds were calculated then crosschecked between myself and mobile. The wind was a steady 12 knot left cross so it was decided I would offset my approach to the left side of the runway. I was passing through 14,000 feet when I spotted the welcome sight of Alconbury's primary runway at my one o'clock position. A few minutes later I arrived over the field with enough altitude to do two 360 degree turns before entering the

flameout pattern. From then on it was almost anticlimatic. As I flew the pattern I continuously crosschecked my altitude and airspeed with mobile. Small adjustments were made and almost before I knew it the TR-1 had touched down safely and rolled to a stop 6,000 feet down the runway. I'll never forget thinking how good the ground felt as I stepped from the aircraft and opened up my helmet. (Okay, Manny, we've covered your three rules. Now it's my turn to share some advice.)

The Infamous "Bottom Line"

Every war story has a bottom line and this is mine. In the past, SAC has experienced class A mishaps in which the aircraft was destroyed and the crew lost. In each case, the mishap could have been prevented if the pilot had flown the aircraft first and then taken care of the emergency. Get the aircraft under control and then use the rest of the crew to help solve the problem. Know your aircraft and its systems. When things are falling apart around you is **not** the time to realize that you haven't looked at a Dash One in six months. Finally, try to have a game plan in mind for how you would handle the more serious emergencies. A good plan of action will eliminate confusion, save time and could ultimately lead to the safe recovery of you and your aircraft.

(Manny, if you're still out there somewhere, I hope you're still pounding those three rules into your students' heads. I know of at least one life you helped save.)

About the author. Maj Jinneman was commissioned through the University of Washington's ROTC program in 1974. Following UPT he served tours in the B-52 and the T-37. He entered the U-2/TR-1 program in 1982. He is currently a TR-1 instructor pilot and Chief of Safety for the 17th Reconnaissance Wing, RAF Alconbury, U.K.

PROFESSIONAL PERFORMERS

Flying Crew

Recently, Lt Col Steven C. Stahl, 1ACCS, Offutt AFB, commanded an E-4B on a routine training flight. Other members of the crew included Maj Alan C. May, EP; Maj Michael L. Shannon, IP; Maj James A. Logsdon, FP; Capt Russell P. Braudis, NN; MSgt David L. Bacle, EFE; MSgt Barry G. Fischer, FE; and Sgt Robert L. Stammeyer, FT.

The mission was scheduled as an annual proficiency and IP evaluation for Lt Col Stahl. The first hour of the mission was flown in the instrument pattern at Offutt. During the final approach for Runway 12, Lt Col Stahl had just intercepted the glideslope, reduced thrust, lowered the nose, and placed the flap lever to 30 degrees when the entire crew suddenly heard a very loud "clunk" outside the aircraft, which quickly rolled to the left. Pressure was lost in the No. 3 hydraulic system, and one of the two outboard flap indicator needles went a needle width past the full 30 degree index mark. Lt Col Stahl abandoned the approach and requested vectors to an ILS for runway 30 while Capt Braudis declared an emergency to the 55th SRW command post. Majs May and Logsdon and Sgts Bacle and Stammeyer went to the lower compartment to visually check for damage. They observed the left outboard flap segment trailing above the left wing with damage to both the flap segment and the wing. The pattern was flown at 175 KIAS to give a buffer over the reference speed while staying below the blowup speed for the 30-degree setting. During cruise, it took five degrees right aileron and slight right rudder to maintain heading. Runway 30 was selected for the approach since it allowed the aircraft to remain over the least populated area. No significant control problems were encountered until retarding the throttles for touchdown. While the airspeed was decreasing through 160 KIAS, the crew heard a second loud "clunk" outside the aircraft and Lt Col Stahl encountered a greater left roll which had to be compensated with more right rudder to keep the wings level for the flare. No significant control problems occurred during touchdown or rollout, but ground agencies informed the crew that the left outboard flap segment was dragging from the wing to the runway. With the known hydraulic leak on the wing, the possible fuel leak, and potential hot brakes, the crew evacuated the aircraft. The actions of Lt Col Stahl and his crew demonstrated outstanding airmanship, common sense, and crew coordination to avoid populated areas and land the aircraft safely. Without their exemplary crew actions a much more serious incident could have developed.

Missile Crew

The 91 SMW Crew S-205, 1Lt Virgil A. Grogean II, MCCC, and 1Lt Randall P. Shaffer, DMCCC is SAC's Missile Crew of the Month.

Crew S-205 was on alert at Charlie Launch Control Center with a maintenance team working in the launch control equipment building (LCEB) on an expansion tank. After one of the technicians fell injuring his leg, Crew S-205 initiated their contingency checklist, ensured proper safety harness usage and diverted a nearby maintenance team which returned the injured technician to base for treatment. Later in the alert a compressor began to smoke after being restarted by a pneudraulics team. Through rapid fire/overheat isolation actions and coordination with the maintenance team, a potentially disastrous situation was averted and damage was minimized. Crew S-205 then received a report of Foxtrot LCC being shut down. Immediate reference to their tech data revealed their entire squadron had been isolated from the Primary Alerting System. Coordination with the command post resulted in communications personnel establishing a patch which restored this critical capability to all squadron LCCs.

Crew S-205's professionalism, use of technical data, system monitoring and leadership under stress make them deserving of Missile Crew of the Month.

Missile Maintenance

SrA Gregory W. Jones, 341 SMW, Malmstrom AFB, is SAC's ICBM Maintenance Airman of the Month. Airman Jones works in the Electronics Laboratory and maintains an account of 175 items in error-free condition; he also has provided 100 percent of the qualification and recurring training on the Command Data Buffer weapon system equipment within the E-lab. While assisting the Ogden ALC's System Engineering Level Evaluation Correction Team, Airman Jones provided valuable systems knowledge and received a letter of appreciation for his "extraordinary efforts and professional performance." Airman Jones was selected as a Wing Professional Performer three times and was also selected as the unit Airman of the Quarter for September 1986.

Munitions Maintenance

MSgt Kevin J. Batt, 320 BMW, Mather AFB, is SAC's Munitions Maintenance Airman of the Month. MSgt Batt's professionalism, technical expertise, leadership and experience are a valuable asset to the Air Launched Missile Maintenance (ALMM) branch, which he currently heads. Since May 1986 the ALMM branch has been working with representatives of Boeing and the B-1B flight test center at Edwards AFB for the test launch of a Short Range Attack Missile (SRAM). The project involved the modification of two SRAM boosters with data collection devices for its flight. MSgt Batt assisted in developing the plan of action and schedule of events to ensure a smooth operation. His abilities as a planner were tested when the branch was tasked with a short notice repair of the primary B-1B test booster in January. Foreign object damage in the guidance assembly forced the flight test center to truck the booster back to Mather AFB for repair. MSgt Batt's technicians received the booster late on a Thursday night, repaired it, and had it on its way back to Edwards AFB the following day. The test launch schedule was not delayed and resulted in the first SRAM launch from a B-1B aircraft.

Aircraft Maintenance

TSgt Elizabeth M. Jass, 376 SW, Kadena AB, is SAC's Maintenance Airman of the Month. As her squadron's most knowledgeable KC-135 aircraft inshop jet engine technician, TSgt Jass has identified weaknesses in job proficiency, Maintenance Data Collection (MDC), and Due-In From Maintenance (DIFM) assets. She resolved problems by overlapping shifts, reassigning shift supervisors, and directing Saturday training sessions. TSgt Jass' commitment to excellence and leadership led to her selection as an FMS typhoon evacuation maintenance supervisor. During a recent typhoon evacuation, she assembled her personnel/equipment, harmoniously prepared her dispersal equipment, and deployed to a safe haven location. Upon arrival, she set work priorities, obtained required support from host units, dispatched specialists, and cleared all inflight discrepancies in the minimum possible time. Her direct supervisory involvement produced two fully mission capable alert aircraft within five hours.

Flying Crew

Missile Crew

Missile Maintenance

Munitions Maintenance

Aircraft Maintenance

Minuteman Codes:

More Than Just A Monthly Test

Capt Kenneth M. Gladfelter
4315 CCTS, Vandenberg AFB

It was just another alert. I felt lucky since we only had maintenance activity at one launch facility. The maintenance team chief coordinated the removal of the missile guidance set (MGS) with me and said he was taking it back to the support base. A few hours after the team had left, the wing Codes Division called me and asked, "Did you perform a remote overwrite of the MGS before letting the maintenance team remove it?" As I answered "no," it suddenly hit me. Because I wasn't thinking "codes," I caused a possible compromise of Minuteman Codes by allowing unauthorized access to coded information contained in the MGS. No, this situation really didn't happen to me, but it could have.

As a Minuteman Missile Combat Crew Member, I never considered codes to be very important—just a necessary evil. A hasty review of my codes self-study material and a quick rememorization of Figure 4-1 in SACR 55-56, Vol 1, Control of ICBM Code Components, was enough for me to pass the monthly, multiple choice closed book test. And then I could forget about codes for another month. If I encountered a codes-related problem on alert, I could always reference the regulation or call the Codes Division. I guess you could say I never put much emphasis on codes knowledge—just pass the monthly test and nobody would bother me. But now, as an Initial Qualification Training (IQT) instructor for the Minuteman weapon system, I view codes differently. I now see codes as the backbone of the Minuteman weapon system.

The Minuteman code system is an integral part of the Minuteman weapon system and was designed to fulfill a two-fold purpose: Launch control and nuclear surety. Due to the physical layout of the weapon system, a positive control link is needed between the missile launch crew in the launch control center and the missiles at the remotely located, unmanned launch facilities. A secure code system satisfies this requirement and provides launch control as well as missile monitoring.

In addition, this secure code system prevents unauthorized launch. It is designed to prevent the arming or launching of a Minuteman missile unless authorized by a competent authority. Also, the Minuteman code system enables SAC to comply with the Department of Defense Nuclear Weapon System Safety Standards which contributes to nuclear surety. By ensuring missiles will launch when authorized and preventing them from launching when not authorized, the Minuteman code system is an essential ingredient for the safe operation of the weapon system.

Missile combat crew members tend to focus on Emergency War Order (EWO) knowledge because that's ultimately what the missile business is all about. But how often is this EWO knowledge really used? Short of actual war, this knowledge is normally only used in the Missile Procedures Trainer (MPT) and in the EWO classroom. On the other hand, codes knowledge comes into play each and every alert tour in the day-to-day operation of the weapon system. I think there is a tendency to forget this, especially if everything works like it should. Crew members shouldn't concentrate solely on EWO and overlook the significance of codes when operating the weapon system, just as people shouldn't focus entirely on exercise and ignore the impact of nutrition when designing a fitness program. I'm not downplaying the importance of EWO, let's just not forget the importance of codes. The codes system is the hardware which makes EWO work.

Although the role of codes in the Minuteman weapon system has not changed, there has been increased emphasis on codes knowledge and training throughout SAC. Codes knowledge is being evaluated more extensively in the MPT. Also, rigorous codes training has been incorporated into the Minuteman IQT program where previously it was just presented as an overview. This increased emphasis is necessary and overdue—crew members need more than just a "test taking knowledge" of codes. A sound working knowledge and a constant awareness of codes is necessary for the safe and proper operation of the weapon system. Fortunately, my carefree attitude and limited awareness of codes never resulted in a serious incident. . . but it could have.

About the author. Capt Gladfelter was commissioned through the Air Force Academy. He served as a deputy missile combat crew commander (DMCCC), instructor DMCCC, missile combat crew commander (MCCC), and as an instructor MCCC at Malmstrom AFB, MT. He is currently an ICBM Operations Instructor at the 4315 CCTS.

SAC SAFETY SCREEN

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW AFR 127-2/SS1*.

1 ACCS, Offutt Crew: AC Lt Col Steven C Stahl, EP Maj Alan C May, IP Maj Michael L Shannon, FP Maj James A Logsdon, NN Capt Russell P Braudis, EFE MSgt David L Bacle, FE MSgt Barry G Fischer, FT Sgt Robert L Stammeyer

909 AREFS, Kadena Crew E-123: IP Maj Thomas L Barnes, P 2Lt Christopher M St Cyr, IN Capt Jim S McCready Jr, IB SSgt John P Mozur

909 AREFS, Kadena Crew S-101: IP Maj James J Nakauchi, P 1Lt Robert J Jolly, IN Capt Michael R Scott, IB MSgt Michael W Knapke

321 SMW, Grand Forks Crew R-114: MCCC 1Lt Stephen P Lucky, DMCCC 2Lt Ronald L Evans

91 SMW, Minot Crew E-123: MCCC Capt Douglas J Harvey, DMCCC 1Lt William F Sims

44 SMW, Ellsworth Crew R-181/E-030: MCCC 1Lt David J Kennedy, DMCCC 2Lt Daniel J Wagner Jr

44 SMW, Ellsworth Crew R-084: MCCC 1Lt George R McHorse, DMCCC 2Lt Neal D Corman

325 BMS, Fairchild Crew E-41: AC Maj David Sarver, P 1Lt Arnold Bunch, RN Capt Jeffrey Ortiz, N 1Lt Daniel Sherman, EW 1Lt James Lundy, G SSgt Jim Retemeyer

325 BMS, Fairchild Crew E-11: AC Capt Al Brown, P Capt Mario Pauda, RN Capt Rollan Moriak, N 1Lt James Bonnier, EW 1Lt Paul Schirmer, G TSgt Al Nasimok

60 BMS, Andersen Crew E-11: AC Capt Thomas J Griffith, P 1Lt Robert G Taylor, RN Capt Dennis J Jacobs, N Capt Benjamin E Zerface, EW 2Lt Robert A Whipple, AG SSgt James R Howard

60 BMS, Andersen Crew E-15: AC Capt Anthony R Taijeron, P 1Lt Donald H Summerlin, RN Capt James A Dunn, N Capt Joseph P Uchmanowicz, EW 1Lt Michael W Regan, G Sgt Nicklas K Olson

99 AREFS, Robins Crew R-164: AC Capt Scott P Moffett, P 1Lt Robert S Waguespack, N 1Lt Mark S Bean, BO AIC Michael L Coleman

912 AREFS, Robins Crew R-132: AC Capt Raymond Conway, P 1Lt Lawrence E Nanna, N 1Lt James D Roberts, BO SSgt Ernest F Albritton Jr

715 BMS, Pease Crew E-30: P Capt Edward E Neves, N Capt Charles G Sherlin

715 BMS, Pease Crew R-36: P Capt Lawrence W McCabe, N Capt Curt L Wheeler

715 BMS, Pease Crew R-26: P Capt Joseph D Cardwell, N Capt James M Kenny

393 BMS, Pease Crew S-01: P Maj Kenneth C Anderson, N Maj Thomas L Nunnallee

393 BMS, Pease Crew E-16: P Capt Konstantinos J Atsalis, N Capt Richard C Goad

393 BMS, Pease Crew R-21: P Capt Robert J Ott, N Capt Greg L Schumann

509 AREFS, Pease Crew R-114: AC Capt Russel C Clark, P Capt Jonathan D VanGuilder, N Capt James I Kelley, BO SrA Kenneth G Strother II

509 AREFS, Pease Crew R-121: AC Capt Mark L Spezia, P 1Lt David J Walther, N 1Lt Gregory C Barron, BO Sgt Alvaro P Abraldes

46 AREFS, K I Sawyer Crew R-123: AC Capt William E Lange, P 1Lt Eric J Settergren, N 1Lt Jules C Hoehn, BO SSgt Daryl R Pettis

307 AREFS, K I Sawyer Crew E-171: AC Capt Richard A Burrus, P 1Lt Paul F Pulse III, N 1Lt Timothy J Quinn, BO SSgt Steven K Langner

644 BMS, K I Sawyer Crew R-15: AC Capt Kevin M Keith, P 1Lt William C Hook, RN Capt Jimmy D Lane, NN 1Lt John L Spellmeyer, EW 1Lt Daniel R Rocha, G SSgt John R Ricks

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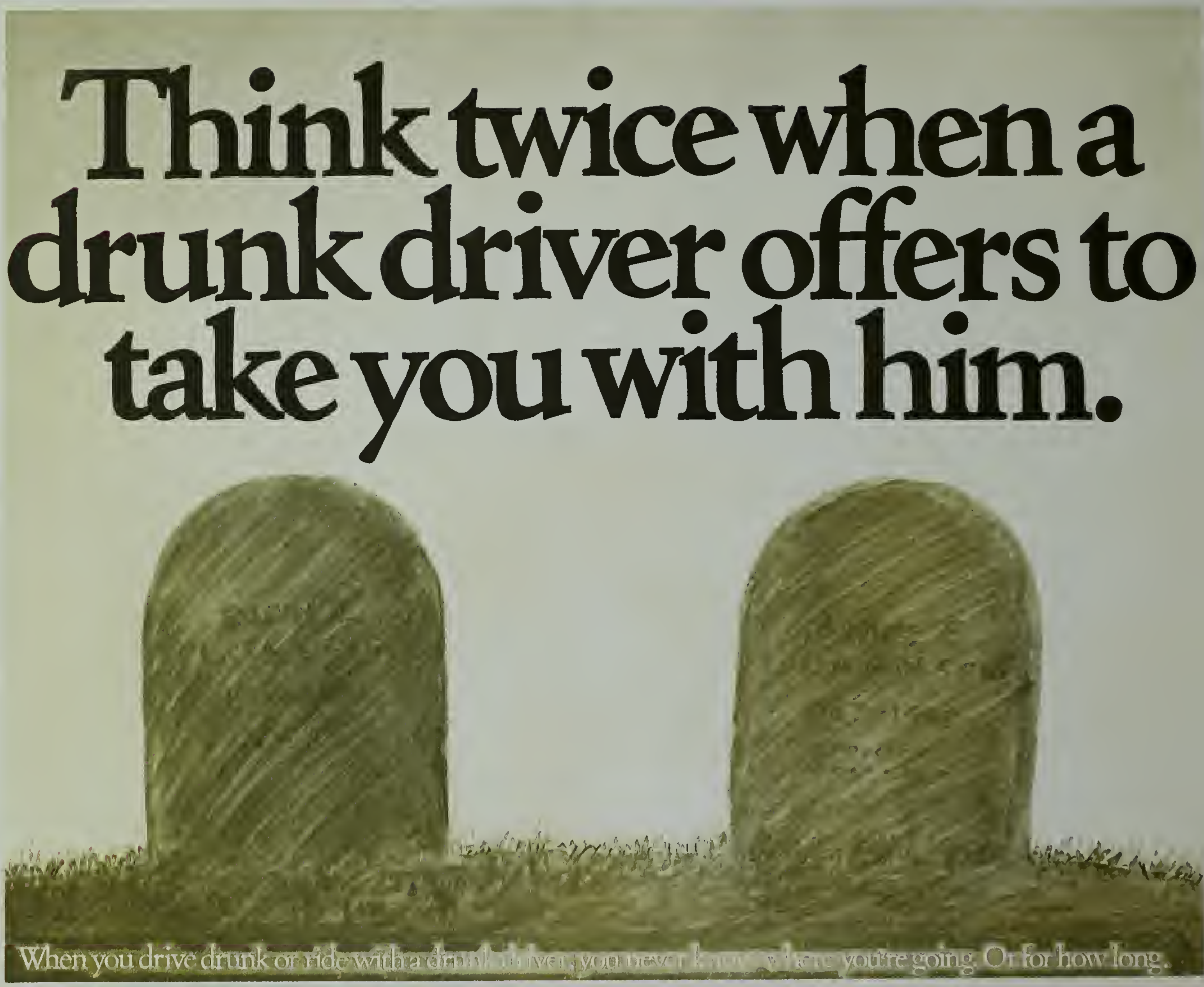
Think twice when a drunk driver offers to take you with him.
When you drive drunk or ride with a drunk driver, you never know where you're going. Or for how long.

A message from the Reader's Digest Foundation